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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Confirmation Number: 9793

In Re PATENT APPLICATION Of:

Applicant(s): Robert D. Allison III)

Serial No. : 10/810,434)

Filed : March 26, 2004)

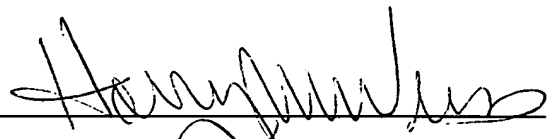
) PETITION TO REVIVE
) ABANDONED APPLICATION
UNDER
) 37 CFR 1.181 (a)
)

For : IGNITION SAFETY DEVICE)
AND METHOD THEREFOR)

Docket No. : 4357P2783

April 21, 2005

I hereby certify that on the 21st day of April, 2005, this Petition to Revive, together with accompanying documents as listed in this cover letter is being deposited with the United States Postal Service with sufficient postage as first class mail to the address shown below.



Harry M. Weiss

Mail Stop Petition
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Please find enclosed as evidentiary attachments to this Petition to Revive Abandoned Application under 37 CFR 1.181 (a), of the Patent Application entitled, "IGNITION SAFETY DEVICE AND METHOD THEREFOR", filed March 26, 2004 in the name of Applicant, Robert D. Allison III:

Exhibit 1: Copy of original Transmittal Letter for the subject Patent Application dated March 26, 2004 showing an incorrect customer number, but also showing the name and Registration Number of the signing attorney, Harry M. Weiss of the firm of Weiss, Moy & Harris, P.C.

Exhibit 2: Copy of original Fee Transmittal for the subject Patent Application dated March 26, 2004 showing the correct Deposit Account Number belonging to the firm of Weiss, Moy & Harris, P.C.

Exhibit 3: Copy of original Inventor's Declaration for the subject Patent Application dated March 26, 2004 showing the correct Customer Number.

Exhibit 4: Copy of original Post Card filed with the subject Patent Application dated March 26, 2004 showing the subject Patent Application accorded a filing date of March 26, 2004, together with an Application Serial Number 10/810,434.

Exhibit 5: Statement from Shirley Brown of the firm of Weiss, Moy & Harris, P.C. stating that no correspondence has been received from the USPTO indicating any communication from the USPTO to the firm of Weiss,

Moy & Harris, P.C. since the filing of the subject Patent Application other than the Post Card (see Exhibit 4. above).

Exhibit 6: A copy of a fax to the firm of Weiss, Moy & Harris, P.C. received from the firm of Conley Rose, P.C. dated March 18, 2005 stating the firm of Conley Rose, P.C. had received a Notice of Abandonment from the USPTO dated March, 14, 2005 in the subject Patent Application together with a copy (as received by the firm of Conley Rose, P.C.) of the USPTO Notice of Abandonment dated March, 14, 2005.

Exhibit 7: A copy of a fax to the firm of Weiss, Moy & Harris, P.C. received from the firm of Conley Rose, P.C. and dated March 24, 2005 in response to a request from D. Landman of the firm of Weiss, Moy & Harris, P.C., who requested a copy of the USPTO Notice to File Corrected Parts (dated June 7, 2004) and which the firm of Conley Rose, P.C. failed to send the firm of Weiss, Moy and Harris, P.C.

REMARKS

Petitioner respectfully states as follows:

1. Referring to Exhibit 1 above, the Transmittal Letter for the subject Patent Application showed an incorrect Customer Number, which clearly **could not** be associated with the firm of Weiss, Moy & Harris, P.C. or the name of Harry M. Weiss as the Registered Patent Attorney that was clearly noted on the Transmittal Letter. The name of the Registered Patent Attorney (Harry M. Weiss) is only associated with Customer Number 23504 and **not** Customer Number 23505.

2. Referring to Exhibit 2 above, the Fee Transmittal (which is page two of the Transmittal Letter) shows the correct Deposit Account Number for the firm of Weiss, Moy & Harris, P.C. for all applicable payments to the USPTO. Therefore, even though the Customer Number (23505) was incorrect on the Transmittal Letter, the **discrepancy** between the incorrect Customer Number (on the Transmittal Letter) which was clearly associated with a **different** customer as compared to the Customer Number associated with the Deposit Account Number belonging to the firm of Weiss, Moy & Harris, P.C. was obvious. Furthermore, the filing fee for filing the subject Patent Application was paid by check in the amount of \$491 by the firm of Weiss, Moy & Harris, P.C. and clearly has been received as payment for the subject Patent Application filed by the firm of Weiss, Moy & Harris, P.C. (**not** filed by the firm of Conley Rose, P.C.).

3. Referring to Exhibit 3, the Inventor's Declaration shows the correct Customer Number for the firm of Weiss Moy & Harris, P.C., viz. **23504**, so that it was obvious that there was a difference between the Customer Number 23505 (the firm of Conley Rose, P.C.) of the Transmittal Letter and the Inventor's Declaration Customer Number of 23504 (the firm of Weiss, Moy & Harris, P.C.).

4. Referring to Exhibit 4, a copy of the Post Card sent with the subject Patent Application, shows receipt by the USPTO of the subject Patent Application and notes a filing date of March 26, 2004 together with a Serial Number of 10/810,434. The Post Card was returned to the addressee, viz. the firm of Weiss, Moy & Harris, P.C. at the firm address for Weiss, Moy & Harris, P.C.

5. Referring to Exhibit 5, a statement made by Shirley Brown of the firm of Weiss, Moy & Harris, P.C. stating that she regularly receives and opens mail at the firm of Weiss, Moy & Harris, P.C. Ms. Brown further attests to non-receipt of any material regarding the subject Patent Application whatsoever from the USPTO, other than the Post Card sent with the original subject Patent Application (see Exhibit 4) and that the docketing records also reflects non-receipt of any material whatsoever from the USPTO regarding the subject Patent Application during the period after receipt of the above-noted Post Card up to the present time.

6. Referring to Exhibit 6, a fax communication dated March 18, 2005 from the firm of Conley Rose, P.C. to the firm of Weiss, Moy & Harris, P.C. stating that the firm of Conley Rose, P.C. received a USPTO Notice of Abandonment dated March 14, 2005 together with a copy of the original Transmittal Letter signed by Harry M. Weiss on March 26, 2004. The fax from

the firm of Conley Rose P.C. states that the subject Patent Application was erroneously noted by the USPTO as being an application of the firm of Conley Rose, P.C., instead of being an application of the firm of Weiss, Moy & Harris, P.C., and **clearly was not forwarded** to the firm of Weiss, Moy & Harris, P.C. until it was **too late** for the firm of Weiss, Moy & Harris to respond to this USPTO Notice of Abandonment, which had been triggered by a **non-received** USPTO Notice to File Corrected Parts dated June 7, 2004.

7. Referring to Exhibit 7, the firm of Conley Rose, P.C. failed to send the firm of Weiss, Moy and Harris, P.C. a copy of the above-mentioned USPTO Notice to File Corrected Parts (dated June 7, 2004) with then (above noted) March 18, 2005 fax, **until after** D. Landman of the firm of Weiss, Moy & Harris, P.C. on March 24, 2005 (6 days **after** the fax from the firm of Conley Rose P.C. stating that subject Patent Application had been abandoned for failure to respond to the USPTO Notice to File Corrected Parts) **requested** of the firm of Conley Rose P.C. that the above-mentioned USPTO Notice to File Corrected Parts be sent to the firm of Weiss, Moy & Harris, P.C. This fax of March 24, 2005 further confirms that the firm of Weiss, Moy & Harris, P.C. **did not receive such correspondence from the USPTO until after the date of Abandonment.**

Petitioner respectfully requests withdrawal of the holding of abandonment under 37 CFR 1.181 based on the citation in the MPEP 711.03(c) of the ruling in *Delgar, Inc. et al. v. Schuyler*, 172 USPQ 513 (D.D.C. 1971), which held that **“the Office should mail a new Notice of Allowance in view of the evidence presented in support of the contention that the applicant’s representative did not receive the original Notice of Allowance”** (emphasis added). Petitioner’s above-stated facts (see above), together with the attached Exhibits 1-7 **clearly** demonstrate that Applicant’s Representative had no way

of knowing that any USPTO Notices had been directed to the firm of Weiss, Moy & Harris, P.C. until **after** the firm of Weiss, Moy & Harris, P.C. was made aware of such Notices by the firm of Conley Rose, P.C. **on March 18, 2005 (i.e., 4 days after the date of Abandonment was sent to the firm of Conley, Rose, P.C.).**

According to the MPEP 711.03(c), a Petition to Revive Abandoned Application under 37 CFR 1.181 (a) does not require a filing fee.

In addition, the response to the Notice to File Corrected Parts (dated June 7, 2004) for the subject Patent Application is attached.

1. This includes the originally filed subject Patent Application with corrected spacing in the Specification, Claims and Abstract to comply with the requirement of the Notice to File Corrected Parts. No new matter whatsoever has been added to the corrected originally filed subject Patent Application.
2. This also includes the originally filed corrected drawings to comply with the requirement of the Notice to File Corrected Parts. No new matter whatsoever has been added to the corrected drawings originally filed with the subject Patent Application.

The above detailed and factual showing with the Exhibits and explanations of the pertinence of these items establishes that this abandonment was clearly something that should have been caught by the USPTO personnel, because of the several Exhibits (noted above) associated with the firm of Weiss, Moy & Harris, P.C. Accordingly, a Petition fee should

not be charged (only the customary missing parts fee, the payment of which is to be taken from Deposit Account No. 23-0830). However, should this Petition to Revive Abandoned Application under 37 CFR 1.181 (a) be somehow denied, please consider this communication to be a Petition to Revive Unavoidably Abandoned Application under 37 CFR 1.137 (a), with supporting evidence justifying a Petition to Revive Unavoidably Abandoned Application under 37 CFR 1.137 (a) being the same as the Petition to Revive Abandoned Application under 37 CFR 1.181 (a). The fee for filing a Petition to Revive Unavoidably Abandoned Application under 37 CFR 1.137 (a) is \$250.

FURTHER REMARKS

If there are somehow any fees incurred by this Petition to Revive Abandoned Application under 37 CFR 1.181 (a), please deduct them from our Deposit Account No. 23-0830. In the alternative, should this Petition to Revive Abandoned Application under 37 CFR 1.181 (a) be denied, please deduct any fees incurred by a Petition to Revive Unavoidably Abandoned Application under 37 CFR 1.137 (a) from our Deposit Account No. 23-0830.

Respectfully submitted,

Date: April 21, 2005



Harry M. Weiss
WEISS, MOY & HARRIS, P.C.
Registration No. 19, 497
Telephone: 702-878-7323
Facsimile : 702-878-4510

Exhibit 1

PTO/SB/05 (01-04)

Approved for use through 07/31/2006, OMB 0651-0032

U.S. Patent and Trademark Office, U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number

UTILITY PATENT APPLICATION TRANSMITTAL <i>(Only for new nonprovisional applications under 37 CFR 1.53(b))</i>	Attorney Docket No.	4357P2783
	First Inventor	ALLISON III, ROBERT D.
	Title	IGNITION SAFETY DEVICE...
	Express Mail Label No	ER 44856224 US

APPLICATION ELEMENTS <i>See MPEP chapter 600 concerning utility patent application contents.</i>	ADDRESS TO: Mail Stop Patent Application Commissioner for Patents P.O. Box 1450 Alexandria VA 22313-1450
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1. <input checked="" type="checkbox"/> Fee Transmittal Form (e.g., PTO/SB/17) <i>(Submit an original and a duplicate for fee processing)</i> 2. <input checked="" type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. 3. <input checked="" type="checkbox"/> Specification [Total Pages <u>26</u>] <i>(preferred arrangement set forth below)</i> - Descriptive title of the invention - Cross Reference to Related Applications - Statement Regarding Fed sponsored R & D - Reference to sequence listing, a table, or a computer program listing appendix - Background of the invention - Brief Summary of the invention - Brief Description of the Drawings (if filed) - Detailed Description - Claim(s) - Abstract of the Disclosure 4. <input checked="" type="checkbox"/> Drawing(s) (35 U.S.C. 113) [Total Sheets <u>7</u>] 5. Oath or Declaration [Total Sheets <u>2</u>] a. <input checked="" type="checkbox"/> Newly executed (original or copy) b. <input type="checkbox"/> Copy from a prior application (37 CFR 1.63(d)) <i>(for continuation/divisional with Box 18 completed)</i> i. <input type="checkbox"/> DELETION OF INVENTOR(S) Signed statement attached deleting inventor(s) name in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b). 6. <input type="checkbox"/> Application Data Sheet. See 37 CFR 1.76	7. <input type="checkbox"/> CD-ROM or CD-R in duplicate, large table or Computer Program (Appendix) 8. Nucleotide and/or Amino Acid Sequence Submission <i>(if applicable, all necessary)</i> a. <input type="checkbox"/> Computer Readable Form (CRF) b. Specification Sequence Listing on: i. <input type="checkbox"/> CD-ROM or CD-R (2 copies); or ii. <input type="checkbox"/> Paper c. <input type="checkbox"/> Statements verifying identity of above copies
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ACCOMPANYING APPLICATION PARTS	
9. <input type="checkbox"/> Assignment Papers (cover sheet & document(s)) 10. <input type="checkbox"/> 37 CFR 3.73(b) Statement <i>(when there is an assignee)</i> <input type="checkbox"/> Power of Attorney 11. <input type="checkbox"/> English Translation Document (if applicable) 12. <input checked="" type="checkbox"/> Information Disclosure Statement (IDS)/PTO-1449 <input type="checkbox"/> Copies of IDS Citations 13. <input type="checkbox"/> Preliminary Amendment 14. <input checked="" type="checkbox"/> Return Receipt Postcard (MPEP 503) <i>(Should be specifically itemized)</i> 15. <input type="checkbox"/> Certified Copy of Priority Document(s) <i>(if foreign priority is claimed)</i> 16. <input type="checkbox"/> Nonpublication Request under 35 U.S.C. 122 (b)(2)(B)(i). Applicant must attach form PTO/SB/35 or its equivalent. 17. <input type="checkbox"/> Other:	

18. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in the first sentence of the specification following the title, or in an Application Data Sheet under 37 CFR 1.76

☐ Continuation
 ☐ Divisional
 ☐ Continuation-in-part (CIP)
 of prior application No.:

Prior application information: _____ Examiner: _____ Art Unit: _____
 For CONTINUATION OR DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 5b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

19. CORRESPONDENCE ADDRESS			
<input checked="" type="checkbox"/> Customer Number: <u>23505</u>	OR <input type="checkbox"/> Correspondence address below		
Name			
Address			
City	State	Zip Code	
Country	Telephone	Fax	

Name (Print/Type)	Harry M. Weiss	Registration No. (Attorney/Agent)	19,497
Signature	<i>Harry M. Weiss</i>	Date	3/26/04

This collection of information is required by 37 CFR 1.53(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Mail Stop Patent Application, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

PTO/BB/17 (10-03)

Approved for use through 07/31/2008. OMB 0551-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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FEE TRANSMITTAL
for FY 2004

Effective 10/01/2003, Patent fees are subject to annual revision.

☒ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$) 491.

Complete if Known

Application Number	
Filing Date	
First Named Inventor	ALLISON III, ROBERT D.
Examiner Name	
Art Unit	
Attorney Docket No.	435/P2783

METHOD OF PAYMENT (check all that apply)☒ Check ☐ Credit card ☐ Money Order ☐ Other ☐ None☐ Deposit Account:Deposit
Account
Number
Deposit
Account
Name

23-0830

WEISS, MOY & HARRIS, P.C.

The Director is authorized to: (check all that apply)

☐ Charge fee(s) indicated below ☒ Credit any overpayments☒ Charge any additional fee(s) or any underpayment of fee(s)☐ Charge fee(s) indicated below, except for the filing fee to the above-identified deposit account.**FEE CALCULATION****1. BASIC FILING FEE**

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid
1001 770	2001 385	Utility filing fee	385.
1002 340	2002 170	Design filing fee	
1003 630	2003 255	Plant filing fee	
1004 770	2004 385	Reissue filing fee	
1005 180	2005 80	Provisional filing fee	
SUBTOTAL (1)			(\$) 385.

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

Total Claims	Extra Claims	Fee from below	Fee Paid
Independent	27	20** = 7	63.
Multiple Dependent	4	3** = 1	43.

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	
1202 18	2202 9	Claims in excess of 20	
1201 88	2201 43	Independent claims in excess of 3	
1203 280	2203 145	Multiple dependent claim, if not paid	
1204 88	2204 43	** Reissue independent claims over original patent	
1205 18	2205 9	** Reissue claims in excess of 20 and over original patent	
SUBTOTAL (2)			(\$) 106.

**or number previously paid, if greater. For Reissues, see above

FEE CALCULATION (continued)**3. ADDITIONAL FEES**

Large Entity | Small Entity

Fee Code (\$)	Fee Code (\$)	Fee Description	Fee Paid
1051 130	2051 65	Surcharge - late filing fee or oath	
1052 50	2052 25	Surcharge - late provisional filing fee or cover sheet	
1053 130	1053 130	Non-English specification	
1812 2,620	1812 2,320	For filing a request for ex parte reexamination	
1804 920*	1804 920*	Requesting publication of SIR prior to Examiner action	
1805 1,840*	1805 1,840*	Requesting publication of SIR after Examiner action	
1261 110	2251 55	Extension for reply within first month	
1252 420	2252 210	Extension for reply within second month	
1263 690	2253 475	Extension for reply within third month	
1264 1,480	2254 740	Extension for reply within fourth month	
1255 2,010	2255 1,005	Extension for reply within fifth month	
1401 330	2401 165	Notice of Appeal	
1402 330	2402 165	Filing a brief in support of an appeal	
1403 290	2403 145	Request for oral hearing	
1451 1,510	1451 1,310	Petition to institute a public use proceeding	
1452 110	2452 55	Petition to revive - unavoidable	
1453 1,330	2453 665	Petition to revive - unintentional	
1501 1,330	2501 665	Utility issue fee (or release)	
1502 480	2502 240	Design issue fee	
1503 840	2503 320	Plant issue fee	
1460 130	1460 130	Petitions to the Commissioner	
1807 60	1807 50	Processing fee under 37 CFR 1.17(q)	
1808 180	1808 180	Submission of Information Disclosure Sheet	
8021 40	8021 40	Recording each patent assignment per property (times number of properties)	
1809 770	2809 385	Filing a submission after final rejection (37 CFR 1.129(a))	
1810 770	2810 385	For each additional invention to be examined (37 CFR 1.129(b))	
1801 770	2601 365	Request for Continued Examination (RCE)	
1802 800	1802 800	Request for expedited examination of a design application	

Other fee (specify)

*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) (\$) -0-**SUBMITTED BY**

(Complete if Applicable)

Name (Print/Type)	Harry M. Weiss	Registration No. (Attorney/Agent)	19,497	Telephone	(480) 994-8888
Signature	<i>Harry M. Weiss</i>	Date	3/26/04		

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

This collection of information is required by 37 CFR 1.17 and 1.27. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS.

SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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Exhibit 3

PTO/SB/01 (08-03)

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U.S. Patent and Trademark Office, U.S. DEPARTMENT OF COMMERCE

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DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)



Declaration
Submitted
With Initial
Filing

OR



Declaration
Submitted after Initial
Filing (surcharge
(37 CFR 1.16 (e))
required)

Attorney Docket Number

4357P2783

First Named Inventor

ALLISON III, ROBERT D

COMPLETE IF KNOWN

Application Number

Filing Date

Art Unit

Examiner Name

I hereby declare that:

Each inventor's residence, mailing address, and citizenship are as stated below next to their name.

I believe the inventor(s) named below to be the original and first inventor(s) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

IGNITION SAFETY DEVICE AND METHOD THEREFOR

(Title of the Invention)

the specification of which



is attached hereto

OR



was filed on (MM/DD/YYYY)

as United States Application Number or PCT International

Application Number

and was amended on (MM/DD/YYYY)

(if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or (f), or 365(b) of any foreign application(s) for patent, inventor's or plant breeder's rights certificate(s), or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent, inventor's or plant breeder's rights certificate(s), or any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached?	
				Yes	No
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

☐ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

[Page 1 of 2]

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 21 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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DECLARATION — Utility or Design Patent Application

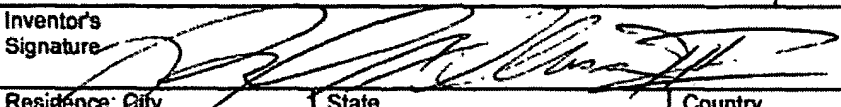

Direct all correspondence to: <input checked="" type="checkbox"/> Customer Number: 23504 OR <input type="checkbox"/> Correspondence address below			
Name			
Address			
City		State	
Country		ZIP	
Telephone		Fax	
I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.			
NAME OF SOLE OR FIRST INVENTOR:		<input type="checkbox"/> A petition has been filed for this unsigned inventor	
Given Name (first and middle (if any)) ROBERT D		Family Name or Surname ALLISON, III	
Inventor's Signature 			Date 3/26/04
Residence: City LAS VEGAS	State NEVADA	Country USA	Citizenship US
Mailing Address 5783 HICKAM AVE			
City LAS VEGAS	State NV	ZIP 89130	Country USA
NAME OF SECOND INVENTOR:		<input type="checkbox"/> A petition has been filed for this unsigned inventor	
Given Name (first and middle (if any))		Family Name or Surname	
Inventor's Signature			Date
Residence: City	State	Country	Citizenship
Mailing Address			
City	State	ZIP	Country
<input type="checkbox"/> Additional inventors or a legal representative are being named on the supplemental sheet(s) PTO/SB/02A or 02LR attached hereto			

EXHIBIT 4

Applicant ALLISON III 4357 P2783
 Serial No. _____
 Filed _____
 Title/Mark IGNITION SAFETY DEVICE AND METHOD

RECEIVED

The Following has been received in the U.S.
 Patent and Trademark Office on the date stamped hereon: APR 05 2004

<input checked="" type="checkbox"/> Specification & Claims	22782 U.S. PTO 10/810434  032604	<input type="checkbox"/> Trademark Appl. & Specimens
<input checked="" type="checkbox"/> Oath or Declaration		<input checked="" type="checkbox"/> Servicemark Appl. & Spec.
<input type="checkbox"/> Petition		<input checked="" type="checkbox"/> Declaration <input checked="" type="checkbox"/> Small Entity
<input checked="" type="checkbox"/> Power of Attorney		<input type="checkbox"/> Amendment Letter
<input checked="" type="checkbox"/> Transmittal Letter		<input type="checkbox"/> Response
<input type="checkbox"/> Priority Document		<input type="checkbox"/> Certified Copy
<input type="checkbox"/> Assignment		<input type="checkbox"/> Extension of Time
<input checked="" type="checkbox"/> Drawings (7 sheets)		<input type="checkbox"/> Base Issue Fee Transmittal
<input checked="" type="checkbox"/> Disclosure Statement		<input type="checkbox"/> Design Patent Application
<input checked="" type="checkbox"/> Check No. _____ for \$ <u>491.00</u>		

WEISS & MOY, P.C.
 4204 N. Brown Avenue
 Scottsdale, AZ 85251-3914

Specializing in:
Patents, Trademarks & Copyrights
& Corporate Matters

Jeffrey L. Weiss*
Jeffrey D. Moy*
Andrew M. Harris*
Farley I. Weiss
Mark H. Weiss
Craig R. Weiss*
Janine Rickman Novatt*
Karen J. Sepura
Veronica-Adele R. Cao*

Of Counsel:

Harry M. Weiss*
Alan M. Ehrlich, Ph.D.*
Jessica J. Weiss

Patent Agent:

David Landman, Ph.D.
Jason E. Robertson

**Registered Patent Attorney*

Our Ref. 3778P2364
Your Ref.

Petitions Office
United States Patent and
Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

Re: U.S. Patent Application Entitled -
IGNITION SAFETY DEVICE AND METHOD THEREFOR
U.S. Serial No.: 10/810,434; Filed: 03-26-2004
Inventor(s): Allison III, Robert D.

Dear Sir:

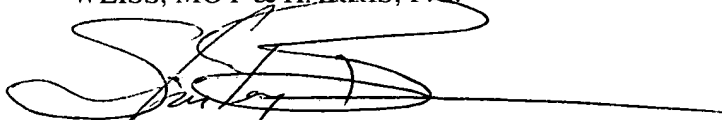
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WEISS, MOY & HARRIS, P.C.


Shirley Brown



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UTILITY
PATENT APPLICATION
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(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.	4357P2763
First Inventor	ALLISON II, ROBERT D.
Title	IGNITION SAFETY DEVICE...
Express Mail Label No.	ER 44856264 US

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

ADDRESS TO:

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1. ☒ Fee Transmittal Form (e.g., PTO/BB/17)
(Submit an original and a duplicate for fee processing)
Applicant claims small entity status.
See 37 CFR 1.27.
2. ☒ Specification (Total Pages 25)
(Preferred arrangement and form below)
 - Descriptive title of the invention
 - Cross Reference to Related Applications
 - Statement Regarding Paid Sponsorship R & D
 - Reference to sequence listing, a table, or a computer program (filing separate)
 - Background of the invention
 - Brief Summary of the invention
 - Brief Description of the Drawings (if filed)
 - Detailed Description
 - Claim(s)
 - Abstract of the Disclosure
3. ☒ Drawing(s) (35 U.S.C. 115) (Total Sheets 2)
4. ☒ Oath or Declaration (Total Sheets 2)
 - a. ☒ Newly executed (original or copy)
 - b. ☐ Copy from a prior application (37 CFR 1.63(d))
(for continuation/divisional with Box 19 completed)
 - c. ☐ DELETION OF INVENTOR(S)
Signed statement attached detailing inventor(s)
name in the prior application, see 37 CFR
1.63(c)(3) and 1.32(h).
5. ☐ Application Data Sheet. See 37 CFR 1.78

6. ☐ CD-ROM or CD-R in duplicate, large table or
Computer Program (Appendix)
7. ☐ Nucleotide and/or Amino Acid Sequence Submission
(if applicable, all necessary)
 - a. ☐ Computer Readable Form (CRF)
 - b. ☐ Specification Sequence Listing on:
 - i. ☐ CD-ROM or CD-R (2 copies); or
 - ii. ☐ Paper
 - c. ☐ Statements verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

8. ☐ Assignment Papers (cover sheet & document(s))
9. ☐ 37 CFR 1.78(b) Statement of Power of Attorney
(when there is an assignment)
10. ☐ English Translation Document (if applicable)
11. ☐ Information Disclosure Statement (IDS)/PTO-1449
12. ☐ Preliminary Amendment
13. ☒ Reclaim Receipt Postcard (MPEP 608)
(Should be specifically formatted)
14. ☐ Certified Copy of Priority Document(s)
(if foreign priority is claimed)
15. ☐ Nonpublication Request under 35 U.S.C. 122
(b)(2)(B)(i). Applicant must attach form PTO/SB/35
or its equivalent.
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19. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in the first sentence of the specification following the title, or in an Application Data Sheet under 37 CFR 1.78:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No. _____

Prior application information:

Examiner:

All Unit:

For CONTINUATION OR DIVISIONAL APPLICATION: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 6a, is considered a part of the disclosure of the continuing application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion of the disclosure is specifically claimed from the submitted application parts.

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Signature <u>Harry M. Weiss</u>		Date <u>3/26/04</u>

This collection of information is required by 37 CFR 1.53(b). The information is required to obtain or retain a benefit by the public which is in the (and by the USPTO to proceed) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the burden of this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Mail Stop Patent Application, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
10/810,434	03/26/2004	Robert D. Allison III	4357P2783

23505
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CONFIRMATION NO. 9793

ABANDONMENT/TERMINATION
LETTER

OC000000015453459

Date Mailed: 03/14/2005

NOTICE OF ABANDONMENT UNDER 37 CFR 1.53 (f) OR (g)

The above-identified application is abandoned for failure to timely or properly reply to the Notice to File Missing Parts (Notice) mailed on 06/07/2004

- No reply was received.

If a complete reply to the notice was previously filed by applicant within the time period set forth in the notice, applicant may request for reconsideration of the holding of abandonment within 2 months from the mailing of this notice of abandonment by filing a petition to withdraw the holding of abandonment under 37 CFR 1.181(a). No petition fee is required. The petition must be accompanied by a true copy of the originally filed reply and the item (s) identified in one of the following

1. A properly itemized date-stamped postcard receipt (see MPEP § 503),
2. If the originally filed reply included a certificate of mailing or transmission in compliance with 37 CFR 1.8(a), a copy of the certificate of mailing or transmission and a statement in compliance with 37 CFR 1.8(b) (see MPEP §§ 512); or
3. If the reply was filed via Express Mail, a submission satisfying the requirements of 37 CFR 1.10(e) including, for example, a copy of the Express Mail mailing label showing the "date-in" (see MPEP § 513).

Any petition to withdraw the holding of abandonment should be directed to OIPE.

If applicant did not previously file a complete reply within the time period set forth in the notice, applicant may file a petition to revive the application under 37 CFR 1.137

Under 37 CFR 1.137(a), a petition requesting the application be revived on the grounds of **UNAVOIDABLE DELAY** must be filed promptly after the applicant becomes aware of the abandonment and such petition must be accompanied by: (1) an adequate showing of the cause of unavoidable delay; (2) the required reply to the above-identified Notice; (3) the petition fee set forth in 37 CFR 1.17(l); and (4) a terminal disclaimer if required by 37 CFR 1.137(d). See MPEP § 711.03(c) and Form PTO/SB/61.

Under 37 CFR 1.137(b), a petition requesting the application be revived on the grounds of **UNINTENTIONAL DELAY** must be filed promptly after applicant becomes aware of the abandonment and such petition must be accompanied by: (1) a statement that the entire delay was unintentional; (2) the required reply to the above-identified Notice; (3) the petition fee set forth in 37 CFR 1.17(m); and (4) a terminal disclaimer if required by 37

CFR 1 137(d). See MPEP § 711.03(c) and Form PTO/SB/64.

Any questions concerning petitions to revive should be directed to the "Office of Petitions" at (703) 306-9282. Petitions should be mailed to: Mail Stop Petitions, Commissioner for Patents, P.O. Box 1450, Alexandria VA 22313-1450

*A copy of this notice **MUST** be returned with the reply.*



Customer Service Center

Initial Patent Examination Division (703) 308-1202

PART 2 - COPY TO BE RETURNED WITH RESPONSE

Notice of Abandonment

This application is abandoned in view of applicant's failure to timely file a proper reply to the Office notice mailed on 6/07/04.

Petition to Withdraw the Holding of Abandonment

If a complete reply to the notice was previously filed by applicant within the time period set forth in the notice, applicant may request for reconsideration of the holding of abandonment within 2 months from the mailing of this notice of abandonment by filing a petition to withdraw the holding of abandonment under 37 CFR 1.181(a). No petition fee is required. The petition must be accompanied by a true copy of the originally filed reply and the item(s) identified in one of the following:

1. A properly itemized date-stamped postcard receipt (see MPEP § 503);
2. If the originally filed reply included a certificate of mailing or transmission in compliance with 37 CFR 1.8(a), a copy of the certificate of mailing or transmission and a statement in compliance with 37 CFR 1.8(b) (see MPEP § 512); or
3. If the reply was filed via Express Mail, a submission satisfying the requirements of 37 CFR 1.10(e) including, for example, a copy of the Express Mail mailing label showing the "date-in" (see MPEP § 513).

Any petition to withdraw the holding of abandonment should be transmitted by facsimile directly to OIPE Customer Service at (703) 308-7751.

Petition to Revive an Abandoned Application

If applicant did not previously file a complete reply within the time period set forth in the notice, applicant may file a petition to revive the application under 37 CFR 1.137.

Under 37 CFR 1.137(a), a petition requesting the application be revived on the grounds of **UNAVOIDABLE DELAY** must be filed promptly after the applicant becomes aware of the abandonment and such petition must be accompanied by

1. an adequate showing of the cause of unavoidable delay,
2. the required reply to the above-identified notice,
3. the petition fee set forth in 37 CFR 1.17(i); and
4. a terminal disclaimer if required by 37 CFR 1.137(d).

See MPEP § 711.03(c) and Form PTO/SB/61.

Under 37 CFR 1.137(b), a petition requesting the application be revived on the grounds of **UNINTENTIONAL DELAY** must be filed promptly after applicant becomes aware of the abandonment and such petition must be accompanied by

1. a statement that the entire delay was unintentional
2. the required reply to the above-identified notice
3. the petition fee set forth in 37 CFR 1.17(m); and
4. a terminal disclaimer if required by 37 CFR 1.137(d).

See MPEP § 711.03(c) and Form PTO/SB/64.

Any questions concerning petitions to revive should be directed to Office of Petitions at (703) 305-9282.

Any questions regarding this notice should be directed to OIPE Customer Service at (703) 308-1202.

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APPLICATION NUMBER	FILING OR 371 (c) DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NUMBER
10/810,434	03/26/2004	Robert D. Allison III	4357P2783

23505
CONLEY ROSE, P.C.
P. O. BOX 3267
HOUSTON, TX 77253-3267

CONFIRMATION NO. 9793

FORMALITIES LETTER



0C000000012987415

Date Mailed: 06/07/2004

NOTICE TO FILE CORRECTED APPLICATION PAPERS

Filing Date Granted

An application number and filing date have been accorded to this application. The application is informal since it does not comply with the regulations for the reason(s) indicated below. Applicant is given TWO MONTHS from the date of this Notice within which to correct the informalities indicated below. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

The required item(s) identified below must be timely submitted to avoid abandonment:

- A substitute specification in compliance with 37 CFR 1.52, 1.121(b)(3), and 1.125, is required. The specification, claims, or abstract page(s) submitted is not acceptable and cannot be scanned or properly stored because:
 - The line spacing on the specification, claims, or abstract is not 1½ or double spaced (see 37 CFR 1.52(b)).
- Replacement drawings in compliance with 37 CFR 1.84 and 37 CFR 1.121 are required. The drawings submitted are not acceptable because:
 - The drawings have a line quality that is too light to be reproduced (weight of all lines and letters must be heavy enough to permit adequate reproduction) or text that is illegible (reference characters, sheet numbers, and view numbers must be plain and legible) see 37 CFR 1.84(f) and (p)(1)); See Figure(s) 2.
 - Numbers, letters, and reference characters on the drawings must measure at least 0.32 cm (1/8 inch) in height. See Figure(s) 3.

Replies should be mailed to: Mail Stop Missing Parts
Commissioner for Patents
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Page 2 of 2

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PART 3 - OFFICE COPY

IGNITION SAFETY DEVICE AND METHOD THEREFOR

FIELD OF THE INVENTION

This invention relates generally to ignition safety
5 system, and more particularly to a safety system coupled to
a fuse housing to control an ignition circuit.

DESCRIPTION OF THE RELATED ART

Devices having motors, such as cars, motorcycles,
10 lawnmowers, and chainsaws can be dangerous to operate.
Often such motored devices have built-in mechanisms to
provide a warning if an unsafe condition exists. For
example, automobiles feature indicators that display to a
driver if a seatbelt is unfastened or a door is ajar.
15 However, these mechanisms for detecting unsafe conditions
often only result in a warning being indicated, leaving the
user the option to continue operating the motor device in
unsafe conditions.

Unfortunately, seatbelt warnings are often ignored,
20 with potentially fatal consequences in the event of a
collision. Drivers and passengers continue to refuse to
wear seatbelts, in spite of well-established evidence that
seatbelts prevent or reduce injury and the adoption of laws
requiring the use of a seatbelt when driving.

25 Several attempts have been made to solve this problem
by preventing a car from starting when seatbelts are not
properly fastened. Many of these efforts rely on
automobile manufacturers to voluntarily develop,
manufacture, and sell the systems and further rely on
30 consumers to be willing to pay potentially higher prices
for a car that won't start if the seatbelts are not
fastened.

Other attempts to solve this problem involve aftermarket devices that require complex professional installations. Such aftermarket devices and installations are often expensive and require altering original wiring
5 for the device to function correctly.

A need therefore exists to provide an aftermarket safety device that can be manufactured inexpensively and easily installed by an owner without requiring electrical tools or skills.

10 The present invention satisfies these needs, and provides other, related, advantages.

SUMMARY OF THE INVENTION

The foregoing objectives are achieved in the ignition safety system and method therefor.

5 In accordance with one embodiment of the present invention, an ignition safety system is disclosed. It comprises, in combination: a fuse circuit; an ignition circuit coupled to the fuse circuit for starting a motor; a warning circuit for indicating a safety condition; and a
10 control circuit coupled to the warning circuit and the fuse circuit for controlling an operation of the ignition circuit.

In accordance with another embodiment of the present invention, an ignition safety system is disclosed. It
15 comprises, in combination: a fuse circuit comprising a fuse housing; an ignition circuit for starting a motor of a vehicle, the ignition circuit being coupled to the fuse circuit; a warning circuit for indicating a seatbelt condition; and a control circuit comprising an electrical
20 connector, the electrical connector being dimensioned to engage the fuse housing for coupling the control circuit to the fuse circuit, the control circuit being further coupled to the warning circuit, for controlling an operation of the ignition circuit in conformity with the seatbelt condition.

25 In accordance with another embodiment of the present invention, an ignition safety system is disclosed. It comprises, in combination: seatbelt indication means for indicating a seatbelt condition; an electrical connector dimensioned to couple to a fuse housing of an ignition
30 circuit; and a switch coupled to the electrical connector and to the seatbelt indication means for enabling and

disabling the ignition circuit in conformity with the seatbelt condition.

In accordance with another embodiment of the present invention, a safety method is disclosed. It comprises the
5 steps of: providing a fuse circuit for disabling an ignition circuit of a motor at a predetermined electrical current; providing a warning circuit for indicating a safety condition; providing a control circuit; coupling the control circuit to the warning circuit; coupling the
10 control circuit to the fuse circuit; detecting the safety condition; and controlling an operation of the ignition circuit.

The foregoing and other objects, features, and advantages of the invention will be apparent from the
15 following, more particular description of the preferred embodiment of the invention, as illustrated in the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a block drawing of the components of an ignition safety system in accordance with a preferred
5 embodiment of the present invention.

Figure 2 is a perspective illustration depicting an ignition safety system for detecting a condition of a seatbelt in a motor vehicle in accordance with a preferred embodiment of the present invention.

10 **Figure 3** is a schematic diagram of a control circuit for use with a seatbelt switch and coupled to a temperature detector, sound generator, and override mechanism in accordance with a preferred embodiment of the present invention.

15 **Figure 4** is a perspective illustration depicting a proximity detector attached to a seatbelt latch and tongue in accordance with a preferred embodiment of the present invention.

Figure 5 is a perspective illustration depicting a
20 seatbelt orientation detector, warning circuit, and transmitter fastened to a seatbelt in a non-use orientation in accordance with a preferred embodiment of the present invention.

Figure 6 is a perspective illustration depicting the
25 seatbelt orientation detector, warning circuit, and transmitter of **Figure 5** in an in-use orientation and transmitting a signal in accordance with a preferred embodiment of the present invention.

Figure 6A is a perspective illustration of a receiver,
30 control circuit, and fuse panel beneath an automobile dashboard in accordance with a preferred embodiment of the present invention.

Figure 7 is a schematic diagram of a proximity detector, warning circuit, and transmitter in accordance with a preferred embodiment of the present invention.

Figure 8 is a schematic diagram of a receiver and
5 control circuit in accordance with a preferred embodiment of the present invention.

Figure 8A is a schematic diagram of a power supply for the receiver and control circuit of **Figure 8** in accordance with a preferred embodiment of the present invention.

DESCRIPTION OF EMBODIMENTS OF THE INVENTION

With reference now to the figures, and in particular **Figure 1**, an ignition safety device 10 is shown. The
5 ignition safety device 10 comprises, in combination, a fuse circuit 20, an ignition circuit 30 coupled to the fuse circuit 20 for starting a motor 32, a warning circuit 40 for indicating a safety condition, and a control circuit 50 coupled to both the warning circuit 40 and the fuse circuit
10 20 for controlling an operation of the ignition circuit 30.

Referring now to **Figure 2**, in accordance with a preferred embodiment of the present invention, the ignition safety device 10 comprises a seatbelt 60, with the safety condition comprising a condition of the seatbelt 60. The
15 safety device 10 further comprises a vehicle 70, and the motor 32 provides power for the vehicle 70. Although the ignition safety device 10 comprises a seatbelt 60 and the safety condition comprises a condition of the seatbelt 60, it is within the spirit and scope of the present invention
20 that the safety device 10 not comprise a seatbelt so long as an operation of the ignition circuit 30 is controlled in conformity with a safety condition. For example, the safety device 10 may comprise a lawnmower, and the safety condition may be an activated pressure switch for
25 indicating whether a user of the lawnmower is in control of the mower. As another example, the safety device 10 may comprise an airplane, and the safety condition may comprise whether gust locks immobilizing the control surfaces of the airplane wings have been removed.

30 In a preferred embodiment of the present invention depicted in **Figure 2**, the safety device 10 further comprises a seatbelt latch 62 for fastening the seatbelt 60

and a seatbelt switch 64. The seatbelt switch 64 is coupled to the seatbelt latch 62 and to the warning circuit 40. The seatbelt switch 64 is actuated by at least one of a fastening and unfastening of the seatbelt 60, with the
5 safety condition comprising the seatbelt 60 being unfastened.

An advantage of the present embodiment is that a seatbelt 60, seatbelt latch 62 and seatbelt switch 64 are common elements in existing motor vehicles. Typically, a
10 seatbelt switch 64 is coupled by an original manufacturer to a warning circuit 40 to detect and signal to a driver that at least one of the seatbelts 60 is unfastened. This information is typically signaled by an indicator light on a display panel or an audible chime or buzzer, or a
15 combination of methods. Although in the present embodiment the safety device 10 comprises a seatbelt latch 62 and a seatbelt switch 64, it should be understood that significant benefits may be obtained by not having a seatbelt latch 62 and a seatbelt switch 64 as long as a
20 warning circuit 20 detects a seatbelt safety condition. For example, some automobiles have a warning circuit detecting a position of a spring for retracting a seatbelt so that a condition of a seatbelt extended or retracted comprises the safety condition.

25 The seatbelt switch 64 is often coupled to the warning circuit 40 via at least one insulated wire. In a direct acting configuration, the seatbelt switch 64 is open when the seatbelt 60 is unlatched and closed when the seatbelt 60 is latched. In an indirect acting configuration, the
30 seatbelt switch 64 is closed when the seatbelt 60 is unlatched and open when the seatbelt 60 is latched. Although differing in operation, both configurations allow

a determination of whether the seatbelt 60 is latched or unlatched by detecting a voltage across the seatbelt switch 64, and in particular a voltage on a wire leading to the seatbelt switch 64 in relation to ground or to a voltage on
5 a second wire connected to the seatbelt switch 64.

Although in the preferred embodiment a voltage is detected to determine if the seatbelt 60 is latched, it should be understood that significant benefits may be obtained by not detecting a voltage, as long as a determination can be made
10 if the seatbelt 60 is latched. For example, a current through or a magnetic field around the seatbelt switch may instead be measured.

Preferably, the control circuit 50 further comprises an insulation-interrupting connector 52 for coupling to the
15 warning circuit 40. The insulation-interrupting connector 52 allows a person to couple the control circuit 50 to the built-in warning circuit 40 without cutting existing wiring, splicing wires or soldering new connections. Instead, the insulation-interrupting connector, already
20 coupled to the control circuit 50, is simply positioned around an existing wire of the warning circuit 40 and squeezed with a pair of pliers to create an electrical connection with the insulated wire. However, it is within the spirit and scope of the invention to not use an
25 insulation-interrupting connector and instead use other methods of coupling the control circuit 50 to the warning circuit 40 such as traditional electrical techniques including soldering connections, so long as the control circuit 50 is coupled to the warning circuit 40.

30 The fuse circuit 20 further comprises an ignition fuse housing 21 for receiving an ignition fuse 22, and the control circuit 50 further comprises an electrical

connector 54 dimensioned to couple to the ignition fuse housing 21 for controlling an impedance in the fuse circuit 20. For example, motor vehicles commonly feature a fuse panel 72 within easy access of a driver, such as beneath the dashboard of an automobile. The fuse panel 72 usually has fuse housings 73 coupled to fuse circuits 20 which in turn are coupled to various automotive circuits, such as lights and display indicators as well as to the motor ignition circuit 30. These circuits, including the ignition circuit 30, are typically designed so that a circuit is rendered inoperative if an open circuit is encountered across a fuse housing 73, such as when a fuse 74 is removed or has blown as a result of excessive current through the fuse 74. It should be clearly understood that the terms "ignition fuse housing" and "ignition fuse" are used to designate any fuse housing and corresponding fuse whose operation has a controlling effect on an operation of an ignition circuit, although the fuse housing and fuse may be labeled or commonly known by other names in various types of vehicles or by various manufacturers.

Although in the preferred embodiment the control circuit 50 is coupled to the fuse circuit 20 via a connector 54 dimensioned to couple to an ignition fuse housing 21, it should be understood that significant benefits may be obtained by not using a connector 54 coupled to an ignition fuse housing 21, so long as the control circuit 50 is coupled to the fuse circuit 20. For example, the control circuit 50 may be connected to the fuse circuit 40 through traditional electrical techniques such as clipping a wire leading to the ignition fuse housing 21 and connecting leads from the control circuit 50 to the clipped wires ends, thereby coupling a portion of

the control circuit 50 serially with the ignition fuse housing 21.

Electrical connector 54 is dimensioned similar to the ignition fuse 22 and has two contacts 55 that independently couple to the fuse circuit 20 when the connector 54 is inserted into the ignition fuse housing 21. By controlling an impedance between the two contacts 55, the control circuit 50 may cause the ignition circuit 30 to operate normally with an impedance generally similar to an operating ignition fuse 22. Alternatively, by introducing a large impedance or an open circuit between the two contacts 55, the control circuit 50 may cause the ignition circuit 30 to behave as if the ignition fuse 22 has been removed or has blown. Generally, this results in preventing the ignition circuit 30 from starting the motor 32. However, it is within the spirit and scope of the present invention that the ignition circuit 30 not be prevented from starting the motor 32, as long as an operation of the ignition circuit is effected in conformity with a safety condition. For example, the ignition circuit 30 may operate to briefly start and stop the motor 32, or provide a desired amount of current for starting a single motor of a multiple motor device, or as another example may only provide enough current to slowly turn a crankshaft at a speed insufficient to start a motor 32, so that a user can hear the motor attempt to start as a reminder to satisfy the safety condition.

Figure 3 depicts an example of a control circuit 30 in accordance with an embodiment of the present invention. In the illustrative example of **Figure 3**, the control circuit 30 has inputs 102 and 103 coupled to the insulation-interrupting connectors 52 which are further coupled to the

seatbelt switch 63 (see **Figure 2**). The signals from inputs 102 and 103 are acted upon by a signal comparator 104, illustrated in **Figure 3** as a commercially available split Darlington output photocoupler, which provides a signal to
5 a commercially available microcontroller 100, in conformity with either similar or different voltage on inputs 102 and 103.

Because the signal on inputs 102 and 103 will correspond to both the seatbelt switch 63 being open or
10 closed, and also whether the seatbelt switch 63 is direct-acting or indirect acting, polarity switch 110 is provided. Preferably, the polarity switch 110 is a manual switch that may be set according to the type of seatbelt switch 63 in use, and the operation of the microcontroller 100 is
15 determined on a setting of the polarity switch 110.

The microcontroller 100 has an output coupled to a switching device, depicted as transistor 114, for controlling the current through the transistor 114. The current through transistor 114 operates a relay 112 which
20 interrupts a current path between outputs 120 and 121, which are coupled to the contacts of the electrical connector 55 (see **Figure 2**). When the microcontroller 100 determines that the ignition circuit 30 should be enabled, such as when the seatbelt 60 is fastened, the
25 microcontroller 100 disables current flow through the transistor 114, allowing the relay 112 to complete a current path between outputs 120 and 121, enabling the ignition circuit 30 and allowing the vehicle to start normally. In the event a failure occurs anywhere in the
30 circuit, it is preferred that the relay 112 defaults to a position allowing normal operation of the ignition circuit 30.

To minimize current drain on the car battery, the control circuit 50 power supply Vcc may be powered by the ignition circuit 30, using a positive voltage regulator 116. Because in an embodiment of the present invention the control circuit 50 is coupled to the fuse circuit 20 by removing an ignition fuse 22 from an ignition fuse housing 21 and inserting in its place the electrical connector 54, it is preferred that the control circuit 50 be fused, as depicted by fuse 22 in **Figure 3**.

The control circuit 50 further comprises at least one fuse housing 56 connected in parallel, with at least one of the fuse housing 56 being dimensioned to couple to the ignition fuse 22 (see **Figure 2**). By inserting the removed ignition fuse 22 or another fuse of appropriate capacity into a fuse housing 56, the control circuit 50 may provide the current protection designed for the original fuse circuit 20. Because fuses 74 may have varying geometries, the fuse housings 56 may be dimensioned to accept differing fuse geometries. By coupling the fuse housings 56 in parallel, a user may provide proper fuse protection by inserting an ignition fuse 22 or another fuse of appropriate capacity into any fuse housing 56 of proper dimension.

Although in the preferred embodiment, the control circuit 50 is fused, it is within the spirit and scope of the present invention that the control circuit not be fused. For example, the control circuit may have current-limiting elements, or may have no protection from high currents. It should also be understood that substantial benefits may be obtained by not having fuse housings 56 as long as a correct operation of the safety device 10 is

achieved, for example, the control circuit 50 may use circuit breakers, or current-limiting components.

The ignition safety system 10 further comprises an override mechanism for selectively disabling an effect of the control circuit 50 on an operation of the ignition circuit 30. This is illustrated in **Figure 3** as bypass switch 118. When the bypass switch 118 is set to the bypass position a current path from contact 120 is established for both positions of the relay 112, ensuring normal operation of the ignition circuit 50 independent of the seatbelt condition. The bypass switch 118 may be a recessed push-button switch to make it difficult to access. Because operating the bypass switch 118 allows a person to start the vehicle 70 without wearing a seatbelt, it is preferred that any use of the bypass switch 118 be detectable. One possible method is to cover the bypass switch 118 with a tamper-proof foil so that a puncture or removal of the foil is easily detected. Although in the preferred embodiment, the control circuit 50 comprises an override mechanism, it is within the spirit and scope of the present invention that the control circuit 50 not comprise an override mechanism to allow users to avoid the operation of the ignition safety system 10.

The ignition safety system 10 may further comprise a sound generator 108 for providing an audible signal. The control circuit 50 activates the sound generator 108 in response to a change of the safety condition after the motor has started. An illustrative example is shown in **Figure 3**, where the sound generator 108 is coupled to the microcontroller 100. The microprocessor 101 causes the sound generator 108 to sound if the seatbelt 60 is unfastened after being first fastened. Although the

ignition safety system 10 comprises a sound generator, it is within the spirit and scope of the present invention that the ignition safety system 10 not comprise a sound generator, an instead comprise alternative methods to warn
5 a person to fasten a seatbelt 60, such as providing a flashing light or vibrating device. It should be understood by one of ordinary skill that substantial benefits may be obtained by the ignition safety system 10 not providing a warning of a change in the safety
10 condition, so long as an operation of the ignition circuit 30 is controlled in conformity with the safety condition.

The ignition safety system 10 may have a temperature detector 106, and the control circuit 50 disables an effect of the control circuit 50 on an operation of the ignition
15 circuit 50 in conformity with a detection of a temperature below a threshold value. One preferred example of how the temperature detector 106 is incorporated in the present invention is shown in **Figure 3**. When the ambient temperature is below a preset threshold, such as 0 degrees
20 Celsius, the microcontroller 100 allows the ignition circuit 50 to operate normally, regardless of whether the seatbelt 60 is fastened, so that a person may start the vehicle 70 and allow it to warm up without requiring the person to remain in the vehicle 70 wearing a seatbelt 60,
25 or so that a person may start the vehicle 70 remotely to allow it to warm up. When the ambient temperature rises above the threshold temperature, the microcontroller 100 causes the sound generator 108 to emit an audible alert until the seatbelt 60 is fastened.

30 However, it should be understood the circuit depicted in **Figure 3** is an illustrative example and that significant benefits may be obtained by not using the described

microchip 100 and a relay 112 shown and described, as long as the control circuit 50 controls an operation of the ignition circuit 20 by acting on the fuse circuit 20 in conformity with a safety condition. For example, the control circuit 50 may comprise analog or mechanical components, or may comprise software operating on a computer. It should also be clearly understood that one of ordinary skill in the art may modify the circuit depicted in **Figure 3**, such as by removing the temperature detector 106 or sound generator 108, or by removing bypass switch 118 or repositioning bypass switch 118 to directly connect contacts 120 and 121 as another example, without departing from the spirit and scope of the present invention.

The microcontroller 100 is programmed to detect if either the seatbelt 60 is fastened or the temperature is below the preset threshold. If so, an output is generated to enable the ignition circuit 40 by allowing a current through transistor 114, otherwise the output disables the ignition circuit 40. If the car has started, the temperature is above the threshold and the seatbelt 60 is unfastened, a signal is generated to activate the sound generator 108. When a seatbelt fastening is detected, the sound generator (if activated) is deactivated, and the ignition circuit 40 is enabled.

The safety device 10 may further have a control circuit housing 51. The housing 51 is relatively small and easily overlooked so that an operator may not recognize a safety device 10 is installed. It is preferred that the housing be adapted to fasten under a dashboard near the ignition fuse housing 21, such as with adhesives, magnetism, hook and loop material, or fasteners such as screws, as examples. The housing 51 may define apertures

in communication with the at least one fuse housing 56 of the control circuit 50 so that a fuse may be manually inserted or removed without opening the housing 51.

An alternate embodiment of the present invention is depicted in **Figure 4**. In this embodiment the safety device 10 further comprises a seatbelt latch 62 for fastening the seatbelt 60 and a proximity detector 80 for detecting the seatbelt 60 proximate the seatbelt latch 62. The proximity detector 80 is coupled to the warning circuit 40, and the safety condition comprises the seatbelt 60 being unfastened. The proximity detector 80 is preferably be a magnetically activated Hall-effect or reed switch, or any other device capable of detecting when the seatbelt 60 is near the seatbelt latch 62.

Figure 5 depicts an alternate embodiment of the present invention. In this embodiment, the safety device 10 further comprises a detector 81 for detecting at least one of an orientation of the seatbelt and a position of the seatbelt 60, the detector 81 is coupled to the warning circuit 40, and the safety condition comprises the seatbelt 60 not in a protective position. Typically, a seatbelt 60 in use is extended across a wearer's chest, lap, or a combination of chest and lap, as illustrated in **Figure 7**, while a seatbelt in a stored position not in use is typically retracted and positioned to a side of an occupant, as illustrated in **Figure 5**. Further, a seatbelt 60 crossing a wearer's chest as in **Figure 6** typically forms an angle from the vertical as the seatbelt 60 spans from one shoulder to the opposite hip, while a seatbelt designed to cross an occupant's chest tends to hang vertically when not in use as in **Figure 5**. Detection of either a non-vertical orientation, or a position removed from a non-use

position, indicates that a seatbelt 60 is not in use by an occupant.

The detector 81 is fastened to a seatbelt 60 and can detect at least one of a position of the seatbelt 60 and an orientation of the seatbelt 60. Position may be detected in relation to reference points, for example, on each side of a seat. As another example, detector 81 may detect position by detecting an extension of the seatbelt 60 from a non-use position, such as by measuring the travel of a line connecting the seatbelt 60 to a seatbelt anchor point, or by optically detecting the travel of a seatbelt past a sensor. Orientation may be detected by a ball switch or mercury switch, for example, opening or closing a circuit when the seatbelt 60 is removed from vertical.

In accordance with another embodiment of the present invention, the safety device 10 further comprises a transmitter 84 coupled to the warning circuit 40 and a receiver 86 coupled to the control circuit 50 for wirelessly coupling the warning circuit 40 to the control circuit 50. **Figures 5, 6 and 6A** illustrate the use of a transmitter 84 and a receiver 86 in conjunction with a position or orientation detector 81 attached to a seatbelt 60. Coupling the detector 81 of **Figures 6 and 7** to the control circuit 50 of **Figure 7A** with conventional wiring would require long lengths of wire alternately under tension or slack as the seatbelt 60 is extended or retracted. By coupling the transmitter 84 to the warning circuit 40, which is coupled to the detector 81 located on the seatbelt 60 in **Figure 6 and 7**, and coupling the receiver 86 to the control circuit 50, preferably in proximity to or within the housing 51 located under the

dashboard, the warning circuit 40 may be coupled to the control circuit 50 wirelessly.

Upon detection of a seatbelt 60 being used, the warning circuit 40 causes the transmitter 84 to send at least one signal of sufficient duration to substantially ensure detection by the receiver 86. It is desirable that the transmitter 84 emit three sequential one-second signals to ensure proper reception by the receiver 86, although substantial benefit may be obtained with a differing number of signals or signals of different duration, or both. It is also desirable that the receiver 86 be continually operable to detect a signal even before a driver has turned the vehicle key from the vehicle off position. Continuous operation of the receiver 86 may be accomplished by, for example, providing power by battery or by coupling to an appropriate fuse housing with a fuse tap. Because the control circuit 50 may receive power through the ignition circuit fuse housing, the control circuit may not be operable if the signal is received before a user turns the key from the vehicle off position. It is therefore desirable that the receiver 86 maintain a state for notifying the control circuit 50 of receipt of the signal for sufficient time to allow a driver to fasten a seatbelt 60, insert a key, and turn the key to start the car. The notifying state of the receiver 86 may preferably last approximately one minute, although benefit may be obtained from shorter or longer periods.

Although the embodiment depicted in **Figures 6 and 6A** has a transmitter 84 located on a seatbelt 60 in conjunction with a position or orientation detector 81, it should be understood that significant benefit may be obtained when the transmitter 84 is not used in conjunction

with a position or orientation detector 81. For example, the transmitter 84 and receiver 86 may be used in place of the wiring depicted in **Figure 2** coupling the seatbelt switch 64 to the control circuit 50. As another example, 5 the transmitter 84 and receiver 86 may be used in conjunction with a seatbelt proximity detector 80 of **Figure 4** located near a seatbelt latch 62.

Figures 7, 8 and 8A provide an illustration of a preferred embodiment of the present invention. **Figure 7** 10 depicts a circuit diagram illustrating the proximity detector 80 of **Figure 4** as a magnetic switch 130. The warning circuit 40 comprises a microcontroller 132 that is coupled to the transmitter 84. A battery 134 powers the microcontroller 132 which detects when the magnetic switch 15 130 is closed. The magnet 136 is fastened just above the seatbelt tongue, and the switch 130 is fastened to the seatbelt latch 62. The microcontroller 132 is coupled to the transmitter 114, which comprises transmitter controller 140 and transmitter antenna 142.

20 **Figure 8** depicts a circuit diagram illustrating a preferred control circuit 50 and the receiver 86 in accordance with the current embodiment of the present invention. The receiver 86 comprises a receiver antenna 152 coupled to the receiver controller 150. Upon detecting 25 a signal from a transmitter 84, the receiver controller 150 provides a signal to the control circuit 50 indicating that the seatbelt 60 has been fastened.

The microcontroller 160 has an output coupled to a switching device, depicted as transistor 162, for 30 controlling the current through the transistor 162. The current through transistor 162 operates a relay 164 which interrupts a current path between outputs 170 and 171,

which are coupled to the contacts of the electrical connector 55 (see **Figure 2**). When the microcontroller 160 determines that the ignition circuit 30 should be enabled, such as when the seatbelt 60 is fastened, the
5 microcontroller 160 disables current flow through the transistor 162, allowing the relay 164 to complete a current path between outputs 170 and 171, enabling the ignition circuit 30 and allowing the vehicle to start normally. In the event a failure occurs anywhere in the
10 circuit, it is preferred that the relay 164 defaults to a position allowing normal operation of the ignition circuit 30.

Because in an embodiment of the present invention the an ignition fuse 22 is removed from an ignition fuse
15 housing 21 and replaced by the electrical connector 54, it is preferred that the control circuit 50 be fused, as depicted by fuse 22 in **Figure 8**.

In a preferred embodiment of the present invention, the control circuit 50 further comprises at least one fuse
20 housing 56 connected in parallel, with at least one of the fuse housing 56 being dimensioned to couple to the ignition fuse 22 (see **Figure 2**). By inserting the removed ignition fuse 22 or another fuse of appropriate capacity into a fuse housing 56, the control circuit 50 may provide the current
25 protection designed for the original fuse circuit 20. Because fuses 74 may have varying geometries, the fuse housings 56 are dimensioned to accept differing fuse geometries. By coupling the fuse housings 56 in parallel, a user may provide proper fuse protection by inserting an
30 ignition fuse 22 or another fuse of appropriate capacity into any fuse housing 56 of proper dimension.

Although in the preferred embodiment, the control circuit 50 is fused, it is within the spirit and scope of the present invention that the control circuit not be fused. For example, the control circuit may have current-
5 limiting elements, or may have no protection from high currents. It should also be understood that substantial benefit may be obtained by not having fuse housings 56 as long as a correct operation of the safety device 10 is achieved, for example, the control circuit 50 may use
10 circuit breakers, or current-limiting components.

The current embodiment of ignition safety system 10 shown in **Figure 8** further comprises an override mechanism for selectively disabling an effect of the control circuit 50 on an operation of the ignition circuit 30. This is
15 illustrated in **Figure 8** as bypass switch 118. When the bypass switch 118 is set to the bypass position a current path from contact 120 is established for both positions of the relay 112, ensuring normal operation of the ignition circuit 50 independent of the seatbelt condition. The
20 bypass switch 166 is a recessed push-button switch to make it difficult to access. Because operating the bypass switch 166 allows a person to start the vehicle 70 without wearing a seatbelt, it is preferred that any use of the bypass switch 166 be detectable. One possible method is to
25 cover the bypass switch 166 with a tamper-proof foil so that a puncture or removal of the foil is easily detected. Although in the present embodiment, the control circuit 50 comprises an override mechanism, it is within the spirit and scope of the present invention that the control circuit
30 50 not comprise an override mechanism to allow users to avoid the operation of the ignition safety system 10.

The ignition safety system 10 may further have a sound generator 168 for providing an audible signal. The control circuit 50 activates the sound generator 168 in response to a change of the safety condition after the motor 32 has started. An illustrative example is shown in **Figure 8**, where the sound generator 168 is coupled to the microcontroller 160. The microprocessor 160 causes the sound generator 168 to sound if the seatbelt 60 is unfastened after the motor 32 has started. Transistor 188, driven by the current flow through a voltage divider from the fuse circuit 20 through contact 170, is coupled to the microprocessor 160 to reflect the operation of the ignition circuit 30. Although the ignition safety system 10 comprises a sound generator 168, it is within the spirit and scope of the present invention that the ignition safety system 10 not comprise a sound generator, an instead comprise alternative methods to warn a person to fasten a seatbelt 60, such as providing a flashing light or vibrating device. It should be understood by one of ordinary skill that substantial benefits may be obtained by the ignition safety system 10 not providing a warning of a change in the safety condition, so long as an operation of the ignition circuit 30 is controlled in conformity with the safety condition.

The ignition safety system 10 may further comprise a temperature detector 184, and the control circuit 50 disables an effect of the control circuit 50 on an operation of the ignition circuit 50 in conformity with a detection of a temperature below a threshold value. One example of how the temperature detector 184 is incorporated in the present invention is shown in **Figure 8**. When the ambient temperature is below a preset threshold, such as 0

degrees Celsius, the microcontroller 160 allows the ignition circuit 50 to operate normally, regardless of whether the seatbelt 60 is fastened, so that a person may start the vehicle 70 and allow it to warm up without
5 requiring the person to remain in the vehicle 70 wearing a seatbelt 60, or so that a person may start the vehicle 70 remotely to allow it to warm up. When the ambient temperature rises above the threshold temperature, the microcontroller 100 causes the sound generator 168 to emit
10 an audible alert until the seatbelt 60 is fastened.

However, it should be clearly understood the circuit depicted in **Figure 8** is an illustrative example and that significant benefit may be obtained by not using the described microchip 160 and a relay 164 shown and
15 described, as long as the control circuit 50 controls an operation of the ignition circuit 20 by acting on the fuse circuit 20 in conformity with a safety condition. For example, the control circuit 50 may comprise analog or mechanical components, or may comprise software operating
20 on a computer. It should also be clearly understood that one of ordinary skill in the art may modify the circuit depicted in **Figure 3**, such as by removing the temperature detector 184 or sound generator 168, or by removing bypass switch 166 or repositioning bypass switch 166 to directly
25 connect contacts 170 and 171 as another example, without departing from the spirit and scope of the present invention.

The microcontroller 160 is programmed to detect if either the seatbelt 60 is fastened or the temperature is
30 below the preset threshold. If so, an output is generated to enable the ignition circuit 40 by allowing a current through transistor 162, otherwise the output disables the

ignition circuit 40. If the car has started, the temperature is above the threshold and the seatbelt 60 is unfastened, a signal is generated to activate the sound generator 168. When a seatbelt fastening is detected, the
5 sound generator 168 (if activated) is deactivated, and the ignition circuit 40 is enabled.

In order to ensure that the receiver 86 can detect a signal from the transmitter 84 indicating a seatbelt has been fastened prior to a user attempting to start the
10 motor, the receiver 84 maintains a continual power supply Vcc even when the motor is off. **Figure 9A** illustrates a preferred method of supplying power to the receiver 86 and control circuit 50 of **Figure 9** using a positive voltage regulator 180. For ease of installation, it is preferred
15 that input 182 to the voltage regulator 180 is coupled to a fuse circuit that receives continual power at the fuse panel 72 (see **Figures 2** and **6A**) with a fuse tap (not shown). However, it should be clearly understood that alternate methods of providing continual power to the
20 receiver 86, such as providing a battery, or connecting directly to the battery of the vehicle, or by otherwise connecting to vehicle wiring that receive continual power, are within the spirit and scope of the present invention. Further, although the embodiment of the present invention
25 depicted in **Figure 9** shows the receiver 86 and control circuit 50 both use power supply Vcc, significant benefit may be obtained by having the receiver 86 and control circuit 50 have independent power supplies, with the receiver 86 having a continuous supply and the control
30 circuit 50 having a power supply that is not continuous, such as illustrated in **Figure 3**.

In accordance with another embodiment of the present invention the ignition safety system 10 further comprises a removable anti-theft connector 190 so that the ignition circuit 30 is disabled when the anti-theft connector 190 is removed. The anti-theft connector 190 may be connected as shown in **Figure 7** in series with the power supply for the warning circuit 40 so that removal of the anti-theft connector 190 will prevent the warning circuit 40 from communicating a safety condition to the control circuit 50 to enable the ignition circuit 30. Although the removable anti-theft connector 190 is connected in the warning circuit 40 as shown in **Figure 7**, it should be clearly understood that substantial benefit may be obtained by connecting the removable anti-theft connector at any other location in the present invention, so long as removal of the anti-theft connector 190 interrupts the operation of the ignition circuit. The anti-theft connector 190 is a removable device similar to a headphone jack that completes a current path necessary for starting the motor 32 when in place, however, the anti-theft connector 190 may be a smart card such as found in cellular phones, which can be individually encoded to prevent the operation of the ignition circuit unless the proper card is installed, or any other device suitable for interrupting the operation of the ignition safety system 10 when removed.

In accordance with another embodiment of the present invention, an ignition safety system comprises, in combination: seatbelt indication means for indicating a seatbelt condition; an electrical connector 54 dimensioned to couple to a fuse housing 21 of an ignition circuit 30; and a switch 112 coupled to the electrical connector 54 and to the seatbelt indication means for enabling and disabling

the ignition circuit 30 in conformity with the seatbelt condition. The seatbelt indication means may be, for example, a proximity detector 80 for detecting the proximity of a seatbelt to a seatbelt latch, a detector 81
5 for detecting at least one of a proximity and a position of a seatbelt 60, or a seatbelt switch 64. Other examples of the seatbelt indication means include devices to detect if a seatbelt has been extended or retracted such as optical detectors and mechanical devices for detecting if a
10 seatbelt 60 has been removed from a spring-biased retracting coil housing, such as by detecting the tension on a spring or line coupled to the seatbelt 60. The switch 112 preferably is a relay, although it may be, for example, a transistor, a mechanical switch, or other electrical
15 switching mechanisms.

Although preferably the seatbelt indication means is a electrical signal generated by a detector or seatbelt switch and the switch is preferably a relay, it should be clearly understood that substantial benefit may be obtained
20 by having the safety system comprise mechanical components. As an example, it is within the spirit and scope of the present invention that the switch 112 may be a normally-off spring-biased toggle switch, and one end of a string may be fastened to a seatbelt 60 and the other end fastened to the
25 toggle switch 130, so that when the seatbelt 60 is extended the string actuates the toggle switch 130 against the spring bias to allow the ignition circuit 30 to operate, releasing the seatbelt 60 causes the spring bias to close the toggle switch and prevent the ignition circuit 30 from
30 operating.

Method of Operation

In accordance with a preferred embodiment of the present invention, a safety method is disclosed. The
5 method comprises the steps of providing a fuse circuit 20 for disabling an ignition circuit 30 of a motor 32 at a predetermined electrical current, providing a warning circuit 40 for indicating a safety condition, and providing a control circuit 50. The method further comprises
10 coupling the control circuit 50 to the warning circuit 40, coupling the control circuit 50 to the fuse circuit 20, detecting the safety condition, and controlling an operation of the ignition circuit 30.

Preferably, the safety method further comprises the
15 steps of providing a vehicle 70 powered by the motor 32 and providing a seatbelt 60, with the safety condition comprising the seatbelt 60 being fastened. However, it should be clearly understood that substantial benefit may be obtained by not having the motor 32 power a vehicle 70
20 or the safety condition comprise a seatbelt 60 being fastened, as long as an operation of the ignition circuit 30 is controlled in response to the safety condition. For example, the method may instead include the steps of providing a riding lawnmower and providing a pressure
25 sensor in a seat of the lawnmower, with the safety condition being that a user of the mower is seated.

The safety method preferably further comprises providing a seatbelt switch 64, the seatbelt switch 64 being actuated by at least one of a fastening and an
30 unfastening of the seatbelt, and the warning circuit 40 being coupled to the seatbelt switch 64. Typically, automobiles featuring seatbelt warning indicators have a

seatbelt switch 64 and a warning circuit 40 for detecting the seatbelt switch 64 already installed as original equipment by the automobile manufacturer. However, it is within the spirit and scope of the present invention that
5 the seatbelt switch 64 and warning circuit 40 not come as original equipment, but instead are provided as aftermarket additions.

The safety method preferably further comprises providing an insulation-interrupting connector 52 coupled
10 to the control circuit 50, and the coupling of the control circuit 50 to the warning circuit 40 is performed using the insulation-interrupting connector 52. This preferred method of coupling the control circuit 50 to the warning circuit 40 provides the benefit of ease of installation for
15 a layperson and also the benefit of a minimally intrusive and reversible connection. Although in the preferred embodiment of the present invention an insulation-interrupting connector 52 is used, it should be clearly understood that substantial benefit may be obtained by any
20 method that couples the control circuit 50 to the warning circuit 40. For example, a wire of the warning circuit 40 may be cut, the resulting ends stripped of insulation and using connected to a wire of the control circuit 50 using a wire nut.

25 In accordance with another embodiment of the present invention, the safety method comprises providing a detector 81 for detecting at least one of a position and an orientation of the seatbelt 60, with the detector 61 being coupled to the warning circuit 40. Detecting that a
30 seatbelt 60 has changed position or an orientation from a non-use or stored position may indicate that the seatbelt 60 is properly in use. For example, a detector 61 having a

mercury switch or a ball switch attached to a chest strap of a seatbelt 60 may indicate either when the seatbelt is in a substantially vertical orientation, indicating non-use, or in a substantially angled orientation, indicating that the seatbelt is in use. As another example, a
5 detector capable of detecting a position of a seatbelt 60 may be attached to the seatbelt and monitor wireless signals indicating proximity of the detector to one or more signal sources, indicating when the seatbelt is in a
10 position of non-use or of use.

In accordance with another embodiment of the present invention, the safety method comprises the steps of providing a transmitter 84 coupled to the warning circuit 40 and providing a receiver 86 coupled to the control
15 circuit 50 for wirelessly coupling the warning circuit 40 to the control circuit 50. For example, a transmitter 84 may be attached to a seatbelt 60 near a seatbelt detector 81 and powered by battery, to transmit radiofrequency information from the detector 81, and a corresponding
20 receiver 86 may be located under a dashboard near a fuse panel 72. One benefit of the present embodiment is the reduction of lengthy and potentially entangling wiring that may be needed to couple the warning circuit 40 to the control circuit 50. Another benefit arises from the
25 typically small profile of wireless components making the use of an safety method likely to be unnoticed by a casual observer.

In accordance with another embodiment of the present invention, the safety method comprises the steps of:
30 providing an ignition fuse housing 21 coupled to the fuse circuit 20; providing an ignition fuse 22 coupled to the ignition fuse housing 21; and providing an electrical

connector 54 coupled to the control circuit 50. The method further comprises the electrical connector 54 being dimensioned to couple to the ignition fuse housing 21, and coupling the control circuit 50 to said fuse circuit 20
5 comprises removing the ignition fuse 22 from the ignition fuse housing 21 and coupling the electrical connector 54 to the ignition fuse housing 21.

Preferably, the safety method of the present embodiment further comprises the step of providing at least
10 one fuse housing 56 coupled to the electrical connector 54, and coupling the control circuit 50 to the fuse circuit 20 further comprises the step of coupling the ignition fuse 22 to at least one of the at least one fuse housing 56. Providing at least one fuse housing 56, which may be
15 dimensioned to correspond to different standard automotive fuse geometries, coupled to the electrical connector 54 provides a benefit of allowing the ignition fuse 22 removed from the ignition fuse housing 21 to continue to be used as a fuse element. However, it should be clearly understood
20 that substantial benefit may be obtained by not providing at least one fuse housing 56 coupled to the electrical connector 54, and instead using another protective mechanism such as a circuit breaker or current-limiting elements coupled to the electrical connector 54, for
25 example. In addition, it is within the spirit and scope of the present invention that the electrical connector 54 not be coupled to any protective elements such as a fuse or circuit breaker, so long as the described operation results under normal conditions.

WHAT IS CLAIMED IS:

1. An ignition safety system, comprising, in combination:
 - a fuse circuit;
 - 5 an ignition circuit coupled to said fuse circuit for starting a motor;
 - a warning circuit for indicating a safety condition;
 - and
 - a control circuit coupled to both said warning circuit
 - 10 and said fuse circuit for controlling an operation of said ignition circuit.
2. The system of Claim 1, further comprising a seatbelt, said safety condition comprising a condition of said
- 15 seatbelt.
3. The system of Claim 2, further comprising a vehicle, said motor providing power for said vehicle.
- 20 4. The system of Claim 2, further comprising:
 - a seatbelt latch for fastening said seatbelt; and
 - a seatbelt switch, said seatbelt switch coupled to said seatbelt latch and to said warning circuit, said seatbelt switch actuated by a fastening and unfastening of
 - 25 said seatbelt, said safety condition comprising said seatbelt being unfastened.
5. The system of Claim 4, said control circuit further comprising an insulation-interrupting connector for
- 30 coupling to said warning circuit.

6. The system of Claim 2, further comprising:

a seatbelt latch for fastening said seatbelt; and
a proximity detector for detecting said seatbelt
proximate said seatbelt latch, said proximity detector
5 coupled to said warning circuit, said safety condition
comprising said seatbelt being unfastened.

7. The system of Claim 2, further comprising a detector
for detecting at least one of an orientation of said
10 seatbelt and a position of said seatbelt, said detector
being coupled to said warning circuit, said safety
condition comprising said seatbelt not in a protective
position.

15 8. The system of Claim 2, further comprising a transmitter
coupled to said warning circuit and a receiver coupled to
said control circuit for wirelessly coupling said warning
circuit to said control circuit.

20 9. The system of Claim 2, further comprising an override
mechanism for selectively disabling an effect of said
control circuit on an operation of said ignition circuit.

10. The system of Claim 1, said fuse circuit further
25 comprising an ignition fuse housing for receiving an
ignition fuse, said control circuit further comprising an
electrical connector dimensioned to couple to said ignition
fuse housing for controlling an impedance in said fuse
circuit.

11. The system of Claim 10, said control circuit further comprising at least one fuse housing connected in parallel, at least one of said at least one fuse housing being dimensioned to couple to said ignition fuse.

5

12. The system of Claim 1, further comprising a sound generator for providing an audible signal, said control circuit activates said sound generator in response to a change of said safety condition after said motor has started.

10

13. The system of Claim 2, further comprising:

a temperature detector, said control circuit disabling an effect of said control circuit on an operation of said ignition circuit in conformity with a detection of a temperature below a threshold value.

15

14. The system of Claim 1, further comprising a removable anti-theft connector, said ignition circuit is disabled when said anti-theft connector is removed.

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15. An ignition safety system, comprising, in combination:
a fuse circuit comprising a fuse housing;
an ignition circuit for starting a motor of a vehicle,
said ignition circuit being coupled to said fuse circuit;
5 a warning circuit for indicating a seatbelt condition;
and

a control circuit comprising an electrical connector,
said electrical connector being dimensioned to engage said
fuse housing for coupling said control circuit to said fuse
10 circuit, said control circuit being further coupled to said
warning circuit, for controlling an operation of said
ignition circuit in conformity with said seatbelt
condition.

15 16. The system of Claim 15, further comprising a sound
generator for providing an audible signal, said control
circuit activates said sound generator in response to a
change of said safety condition after said motor has
started.

20

17. The system of Claim 15, further comprising:

a temperature detector, said control circuit disabling
an effect of said control circuit on an operation of said
ignition circuit in conformity with a detection of a
25 temperature below a threshold value.

18. The system of Claim 15, further comprising a removable
anti-theft connector, said ignition circuit is disabled
when said anti-theft connector is removed.

30

19. An ignition safety system, comprising, in combination:
seatbelt indication means for indicating a seatbelt
condition;

an electrical connector dimensioned to couple to a
5 fuse housing of an ignition circuit; and
a switch coupled to said electrical connector and to
said seatbelt indication means for enabling and disabling
said ignition circuit in conformity with said seatbelt
condition.

10

20. A safety method comprising the steps of:
providing a fuse circuit for disabling an ignition
circuit of a motor at a predetermined electrical current;
providing a warning circuit for indicating a safety
15 condition;

15

providing a control circuit;
coupling said control circuit to said warning circuit;
coupling said control circuit to said fuse circuit;
detecting said safety condition; and
20 controlling an operation of said ignition circuit.

20

21. The method of Claim 20, further comprising the steps
of:

25

providing a vehicle, said motor powers said vehicle;
and
providing a seatbelt, said safety condition comprises
said seatbelt being fastened.

30

22. The method of Claim 21, further comprising the step of providing a seatbelt switch, said seatbelt switch being actuated by at least one of a fastening and an unfastening of said seatbelt, said warning circuit being coupled to
5 said seatbelt switch.

23. The method of Claim 22, further comprising the step of providing an insulation-interrupting connector coupled to said control circuit, said coupling said control circuit to
10 said warning circuit is performed using said insulation-interrupting connector.

24. The method of Claim 21, further comprising the step of providing a detector for detecting at least one of a
15 position and an orientation of said seatbelt, said detector being coupled to said warning circuit.

25. The method of Claim 20, further comprising the steps of:

20 providing a transmitter coupled to said warning circuit; and

providing a receiver coupled to said control circuit for wirelessly coupling said warning circuit to said control circuit.

25

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26. The method of Claim 20, further comprising the steps of:

providing an ignition fuse housing coupled to said fuse circuit;

5 providing an ignition fuse coupled to said ignition fuse housing; and

providing an electrical connector coupled to said control circuit, said electrical connector being dimensioned to couple to said ignition fuse housing, said
10 coupling said control circuit to said fuse circuit comprises the steps of removing said ignition fuse from said ignition fuse housing and coupling said electrical connector to said ignition fuse housing.

15 27. The method of Claim 26, further comprising the step of providing at least one fuse housing coupled to said electrical connector, said coupling said control circuit to said fuse circuit further comprises the step of coupling said ignition fuse to at least one of said at least one
20 fuse housing.

ABSTRACT

An ignition safety system and method. A control circuit is coupled to a warning circuit indicating a safety
5 condition. The control circuit is further coupled to a fuse circuit to control an operation of a motor ignition circuit in response to the safety condition.

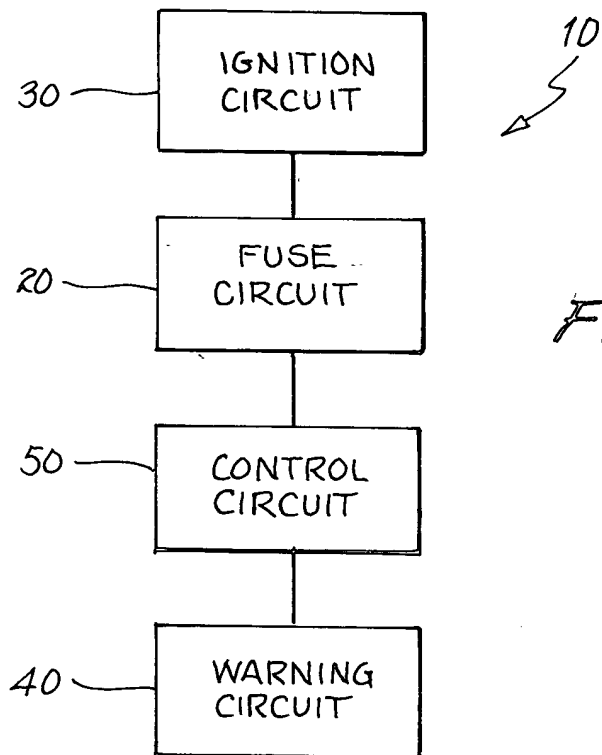


Fig. 1

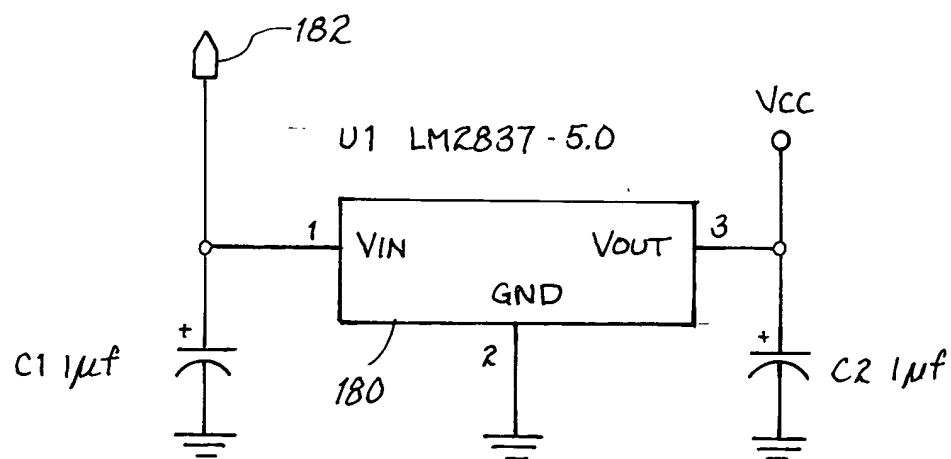
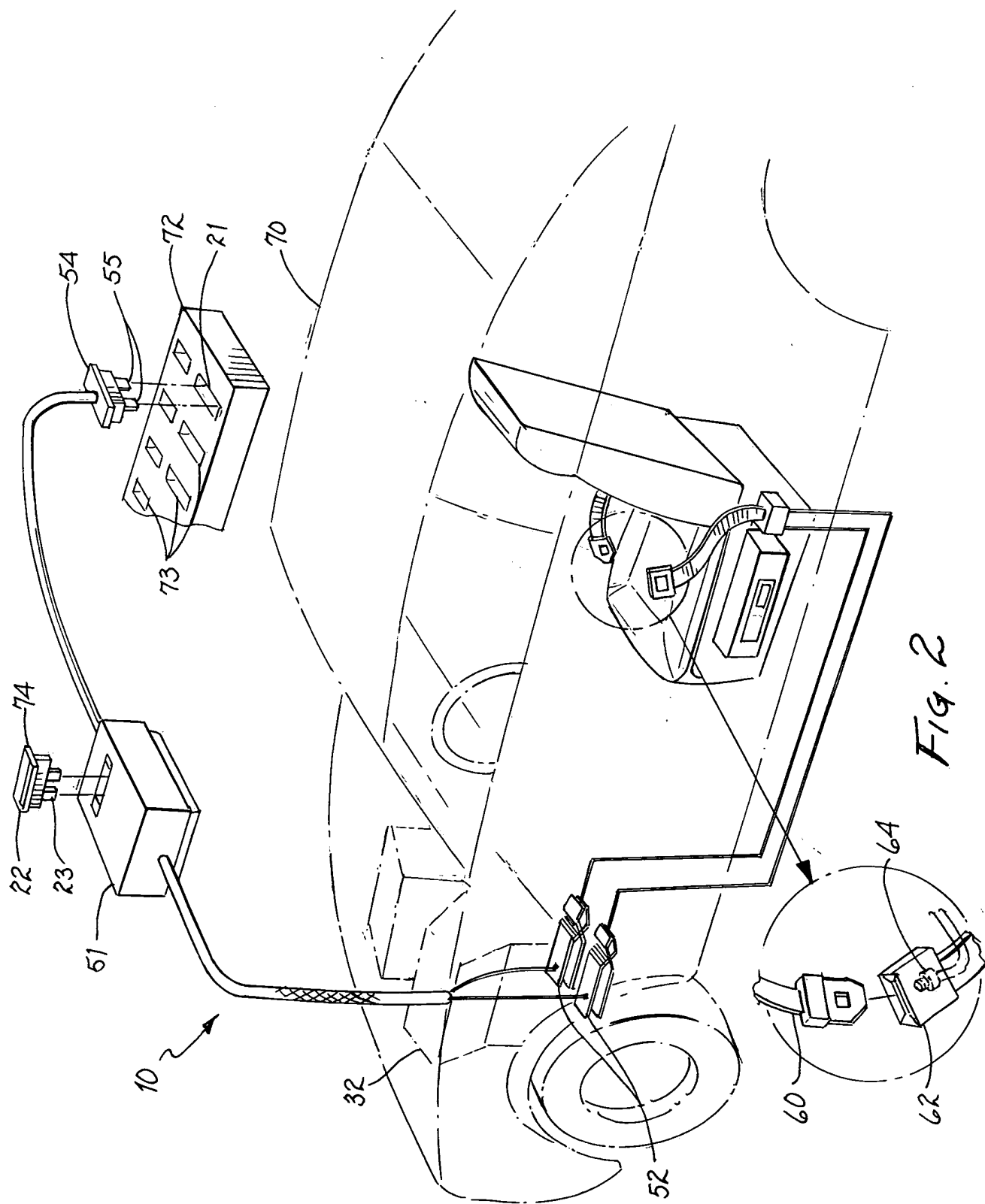
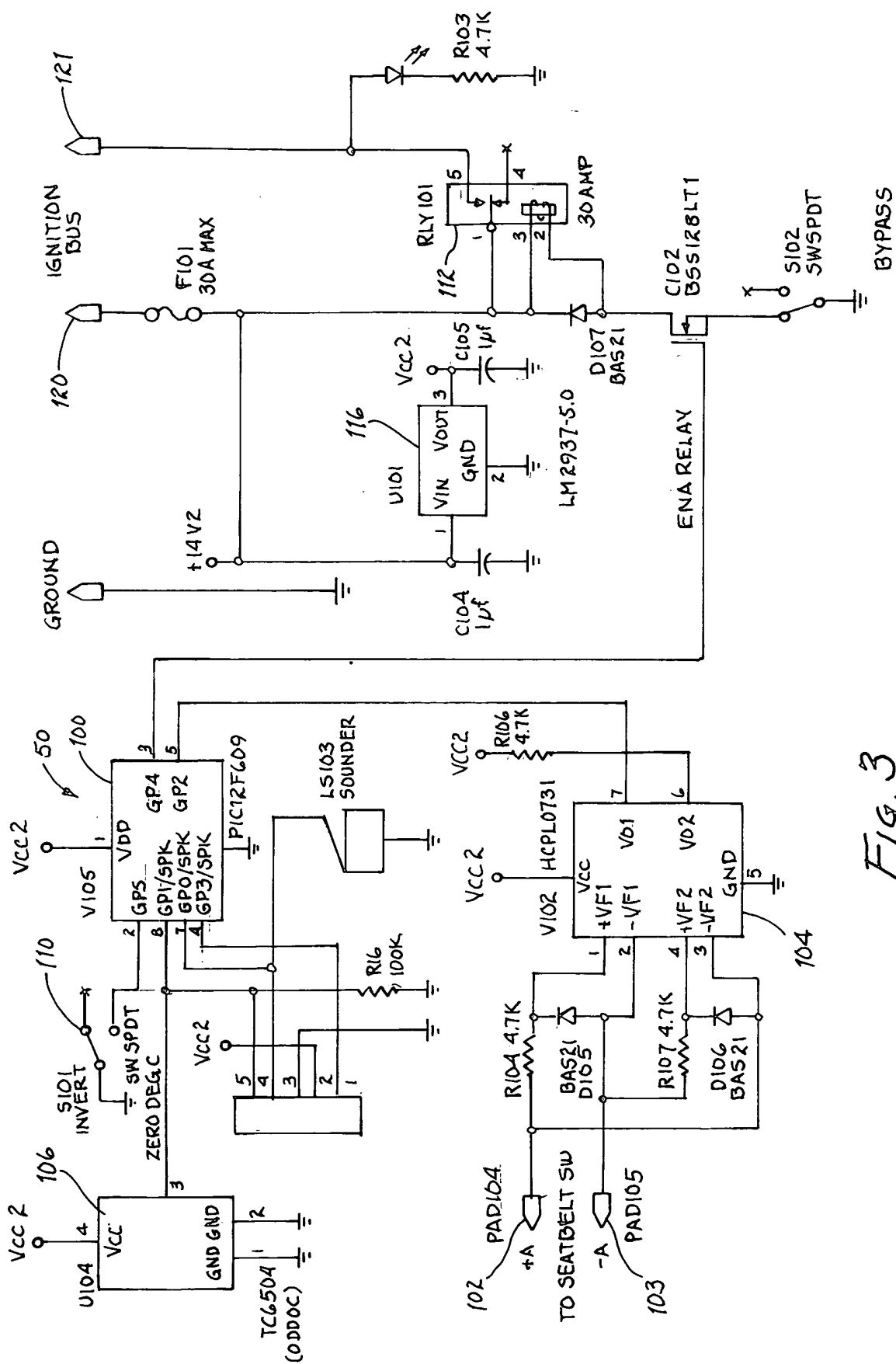


Fig. 8A





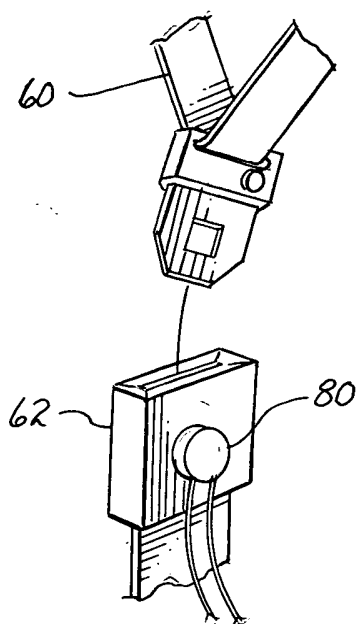


FIG. 4

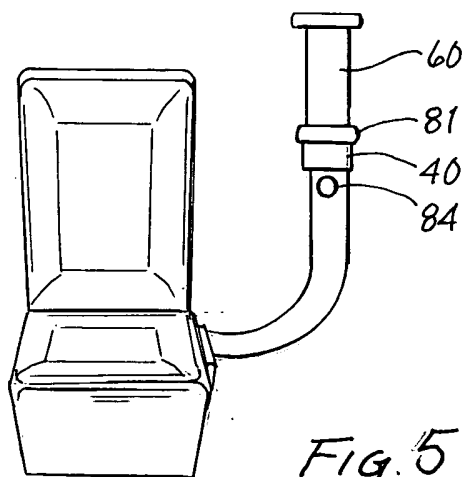


FIG. 5

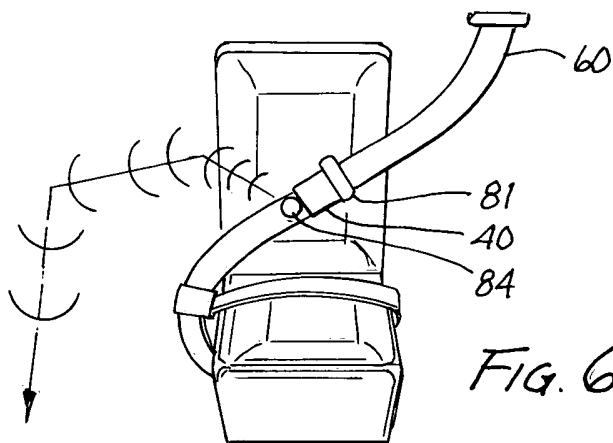


FIG. 6

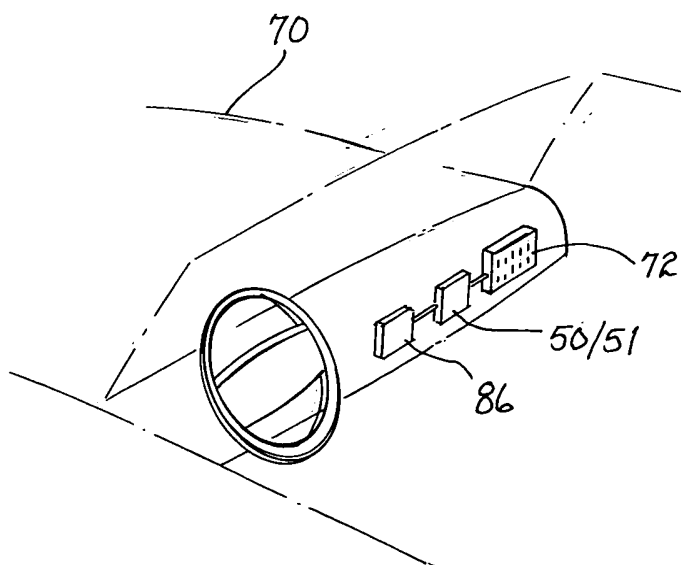


FIG. 6A

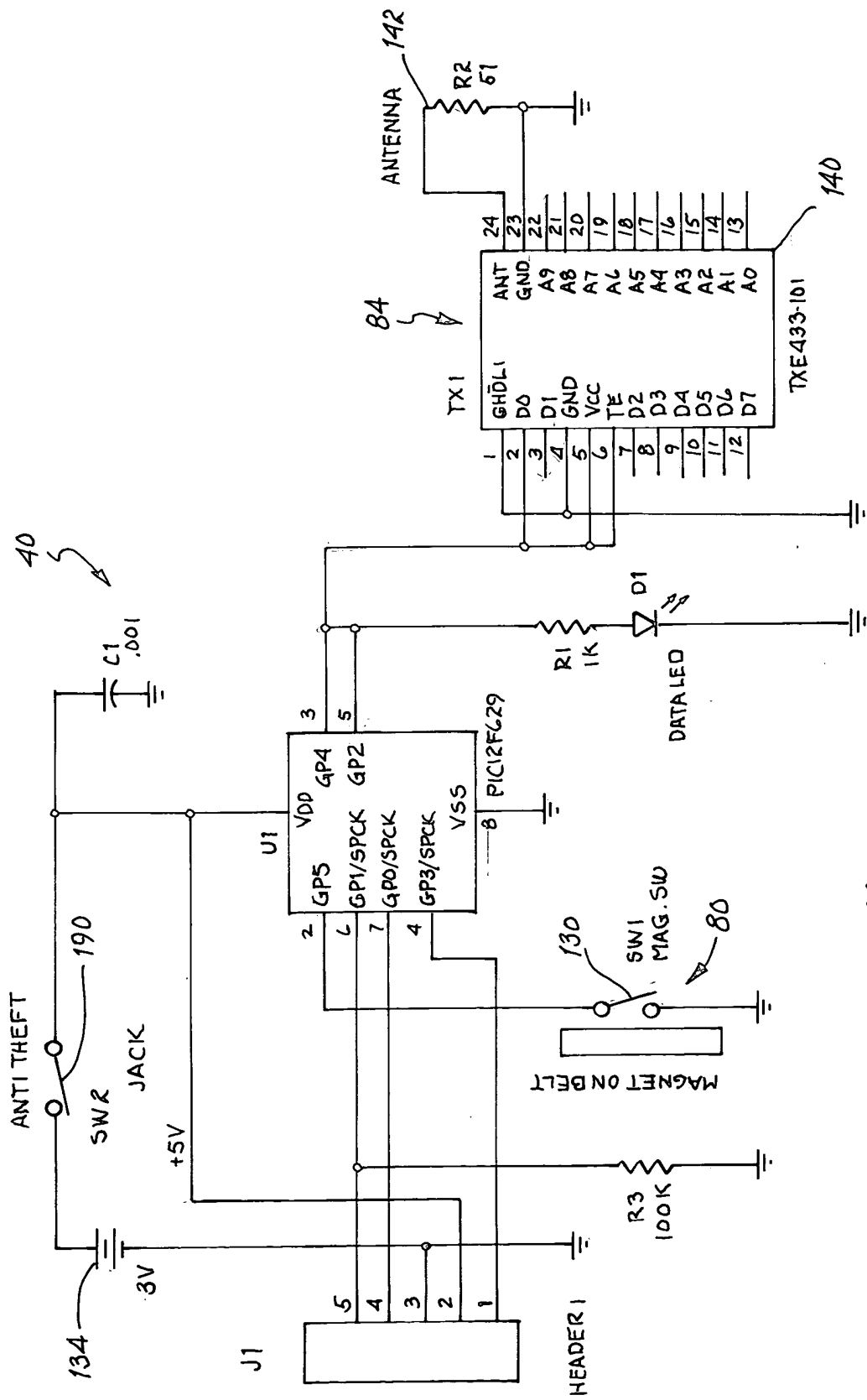


Fig. 7

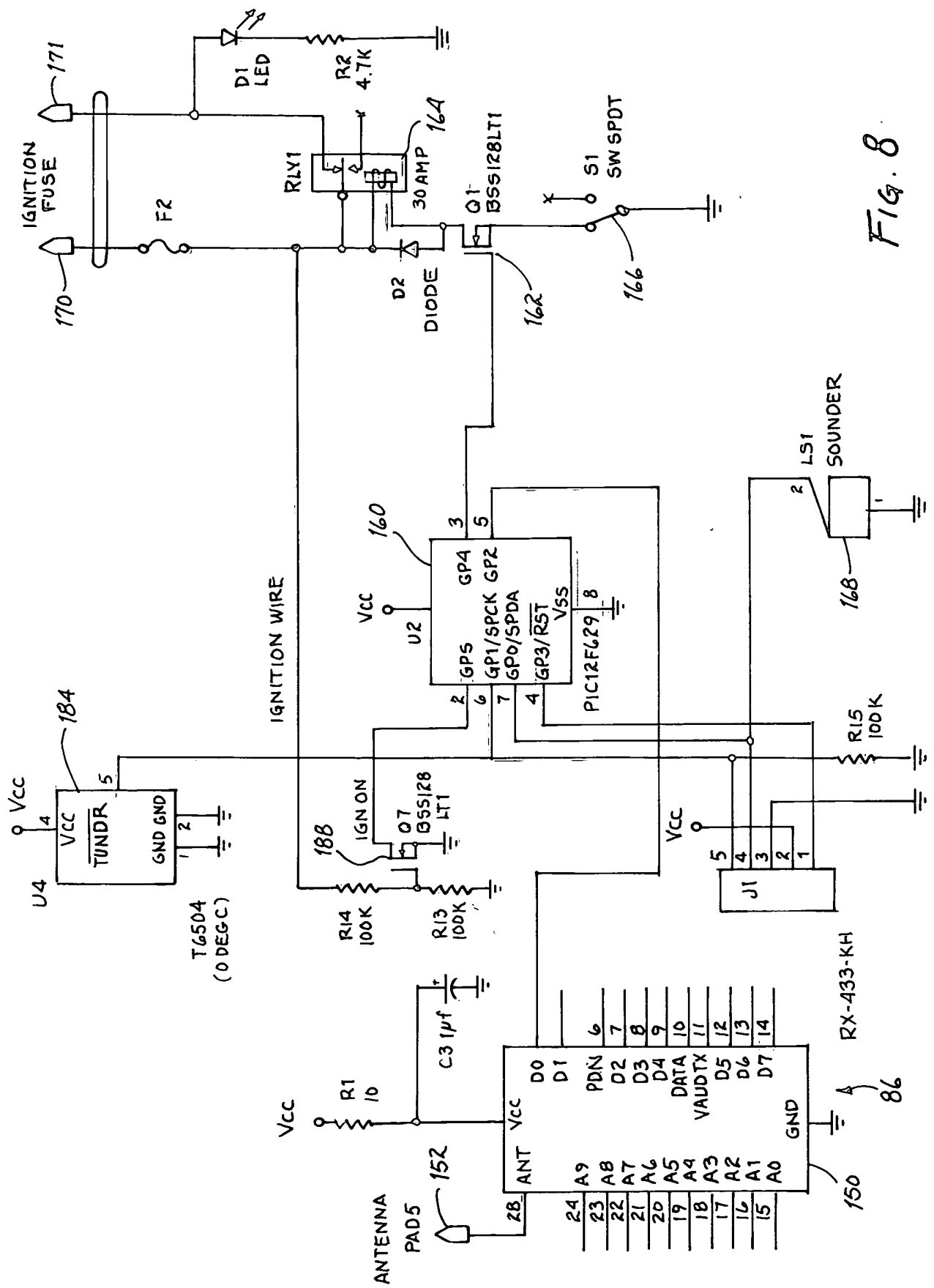


Fig. 8

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